CARIMO

Developed at IIT Bombay

Machine learning you can touch.

CARI AI Learning Labs pairs one benchtop motor kit with five software modules. Your students generate real data, train real models and deploy them to your own board with FlexiBridge.

Machine Learning Kit

Experiment. Learn. Analyze. Innovate.

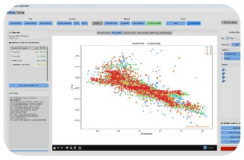
12 live data channels



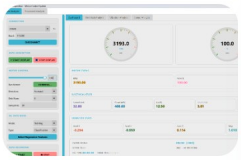
FIVE MODULES, ONE KIT



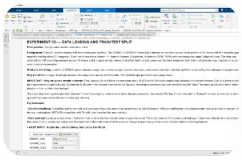
CH 01
AIMX Standard
Python based



CH 02
AIMX Advanced
Python based



CH 03
DAQ Master
Python based



CH 04
CARI Notebooks
MATLAB® based



CH 05
FlexiBridge
Hardware module

1 Generate real data
Run the kit and capture live signals

2 Train real models
Build and validate AI/ML models

3 Deploy with FlexiBridge
Run models on your own board

For students
Build practical skills

For educators
Teach on a flexible platform

For researchers
Reach deeper insights

For industry
Develop real-world solutions

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www.carimotech.com

Five modules.

One complete ecosystem.

Hardware, Python-based platforms and a MATLAB®-based platform.

CALL
CARI AI Learning Labs



AIMX Standard

Python based

CH 01

AI/ML learning platform

- ✓ Machine learning
- ✓ Data visualization
- ✓ Easy-to-use interface
- ✓ Model training
- ✓ Hands-on experiments

No-code app: acquire, explore, train and test. Six experiments and 25 models, enough for a full undergraduate ML lab.

Learn & build machine learning models.

AIMX Advanced

Python based

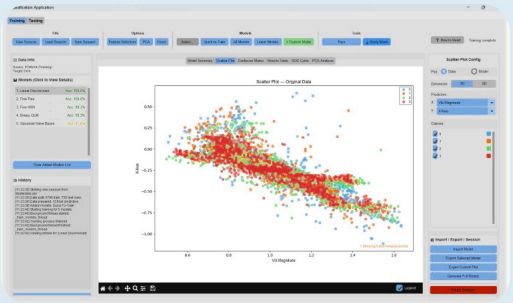
CH 02

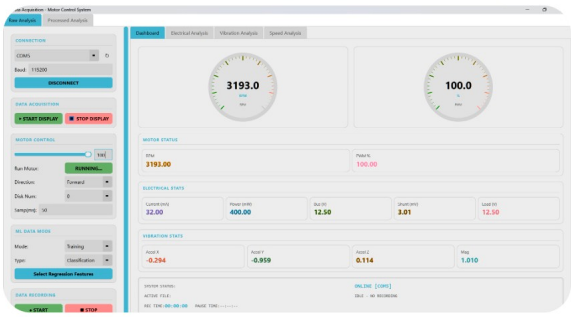
Advanced AI/ML learning platform

- ✓ Advanced machine learning
- ✓ Model development
- ✓ Solve real-world problems
- ✓ Analytics & insights
- ✓ 90+ models

92 models: 42 classification, 40 regression, 10 clustering. Accepts any external CSV, so projects outgrow the kit's own data.

Go beyond basics. Solve real-world problems.





DAQ Master

Python based

CH 03

Data acquisition platform

- ✓ Multi-channel acquisition
- ✓ Data logging & export
- ✓ Analysis & visualization
- ✓ Real-time monitoring
- ✓ Sensor integration

Live dashboard with electrical, vibration and speed analysis, plus one-click recording of timestamped CSV datasets.

Capture today. Analyze tomorrow.

CARI Notebooks

MATLAB® based

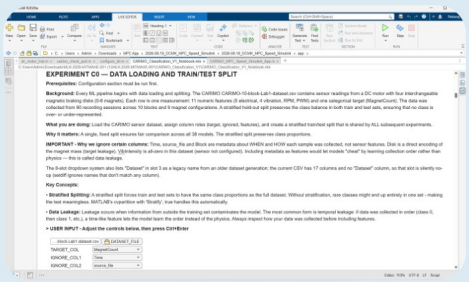
CH 04

Interactive MATLAB® Live Scripts

- ✓ Interactive coding environment
- ✓ Machine learning
- ✓ Learning resources
- ✓ Data analysis & visualization
- ✓ Guided experiments

Four notebooks, 68 guided experiments and 16 browser-based explainers. Runs on your campus MATLAB® licence.

Explore data. Create. Learn. Share.





FlexiBridge

Hardware module

CH 05

Two boards. One live loop.

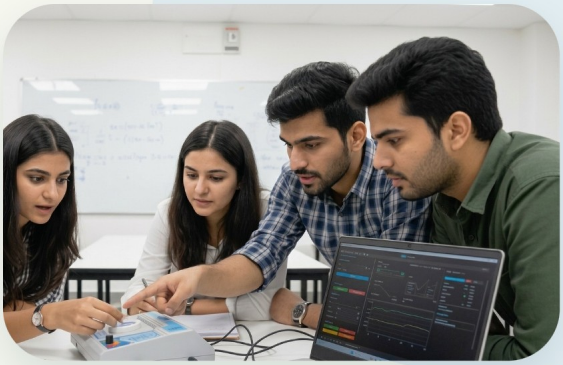
- ✓ Seamless connectivity
- ✓ Sensor integration
- ✓ Multi-device interface
- ✓ Hardware integration

Runs AI/ML and control on real hardware. Pairs the kit with a board your students program, e.g. Arduino Due, ESP32 or STM32 (18+ boards).

Bridge your experiments to endless possibilities. **See page 4.**

Every model is trained on data your students measured.

Real motor, real disturbances, and the full ML pipeline from capture to on-board deployment.





84 MHz
ARM Cortex-M4F

12
live data channels

~3200
RPM at full supply

±8 RPM
speed accuracy

Hardware datasheet

A compact, sensor-rich platform and real-world data generator for hands-on AI education.

Processor	ARM Cortex-M4F @ 84 MHz, FPU; 12-bit ADC
Motor	PMDC with quadrature encoder
Speed	Up to ~3200 RPM (full supply), ±8 RPM accuracy
Current sensor	±3 A range, ±2.5% accuracy; real-time power monitoring
Vibration sensor	3-axis MEMS accelerometer, ±2 g, 1.0 mg resolution
Motor driver	Integrated H-bridge, up to 3.5 A peak
Load system	Hot-swap magnetic load disks of varying magnet count
Vibration control	PWM-adjustable knob, 0-100% intensity, signal modulation
Connectivity	USB 2.0 to PC; timestamped CSV export
Power	12 V DC adapter, 230 V AC mains input
Enclosure	Durable ABS, tabletop, portable; works with Windows 11

12 live channels

Logged at 50 Hz for motor work and 500 Hz for vibration.

Drive	PWM · Vibration intensity
Motion	Speed
Electrical	Current · Power · Voltage ×3
Vibration	Accel X · Accel Y · Accel Z · Magnitude

Honest by construction

Random 80/20 split
0.993

Unseen recording session
0.679

R^2 for one model, scored two ways. Leakage was worth 31 points.

In the box

- ✓ Machine Learning Kit
- ✓ Hot-swap load disks
- ✓ User manual
- ✓ 12 V DC adapter
- ✓ USB cable
- ✓ 1-year warranty

"Easy to set up and run, with no steep learning curve, and good value compared to other lab equipment."

Engineering faculty member. Survey, July 2026.

CARIMO Technologies Pvt. Ltd.

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Two boards.
One live loop.

FlexiBridge
Hardware module

FlexiBridge pairs the kit with a board your students program: the route for deploying AI/ML models and controllers to real hardware in a live loop. Works with 18+ boards.

Machine Learning Kit

The plant

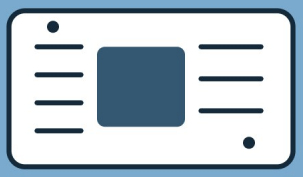


A ready-made black box. Real motor and sensors, sealed.

live sensor data →
← simple commands

Your students' board

The brain



Fully programmable. Students add sensors and run their own models here.



Plug in. Connect. Start experimenting.

One cable links the kit to your own board.

What students build

- ✓ **On-device AI**
  Train Random Forest and Decision Tree models in Python, then run them on the board.
- ✓ **Real-time control**
  Run PID and MPC on live hardware.
- ✓ **Sensor fusion**
  Add your own sensors and combine them with the kit data.
- ✓ **Data collection**
  Log and label your own datasets.

A simple SDK

No serial parsing, no protocol work. Students call a few functions and spend lab time on the algorithm, not the plumbing.

```
FB_Init(); // set up once
while (1) {
FB_Update(); // refresh live data
// read values with simple getters
}
```

What students take away

Hardware in the loop
Every experiment runs on a real motor.

Focus on the algorithm
The plant is sealed, so students work on the part that matters.

Embedded, AI and control
Three core skills practiced together in one lab.

Bridge your experiments to endless possibilities.

Works with: Arduino Mega · Arduino Due · STM32 Nucleo · STM32 Blue Pill · ESP32 · + more

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